

Timing changes for SNS

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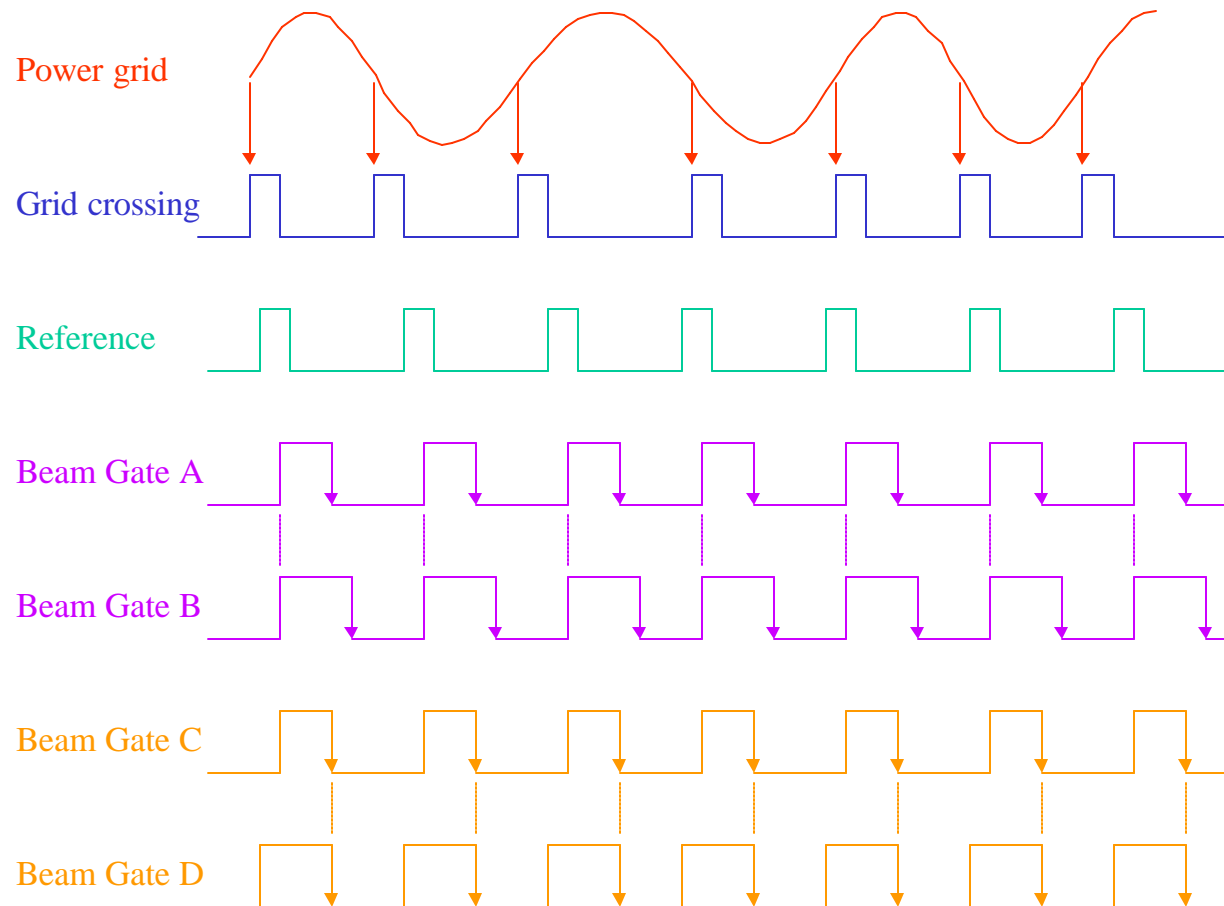
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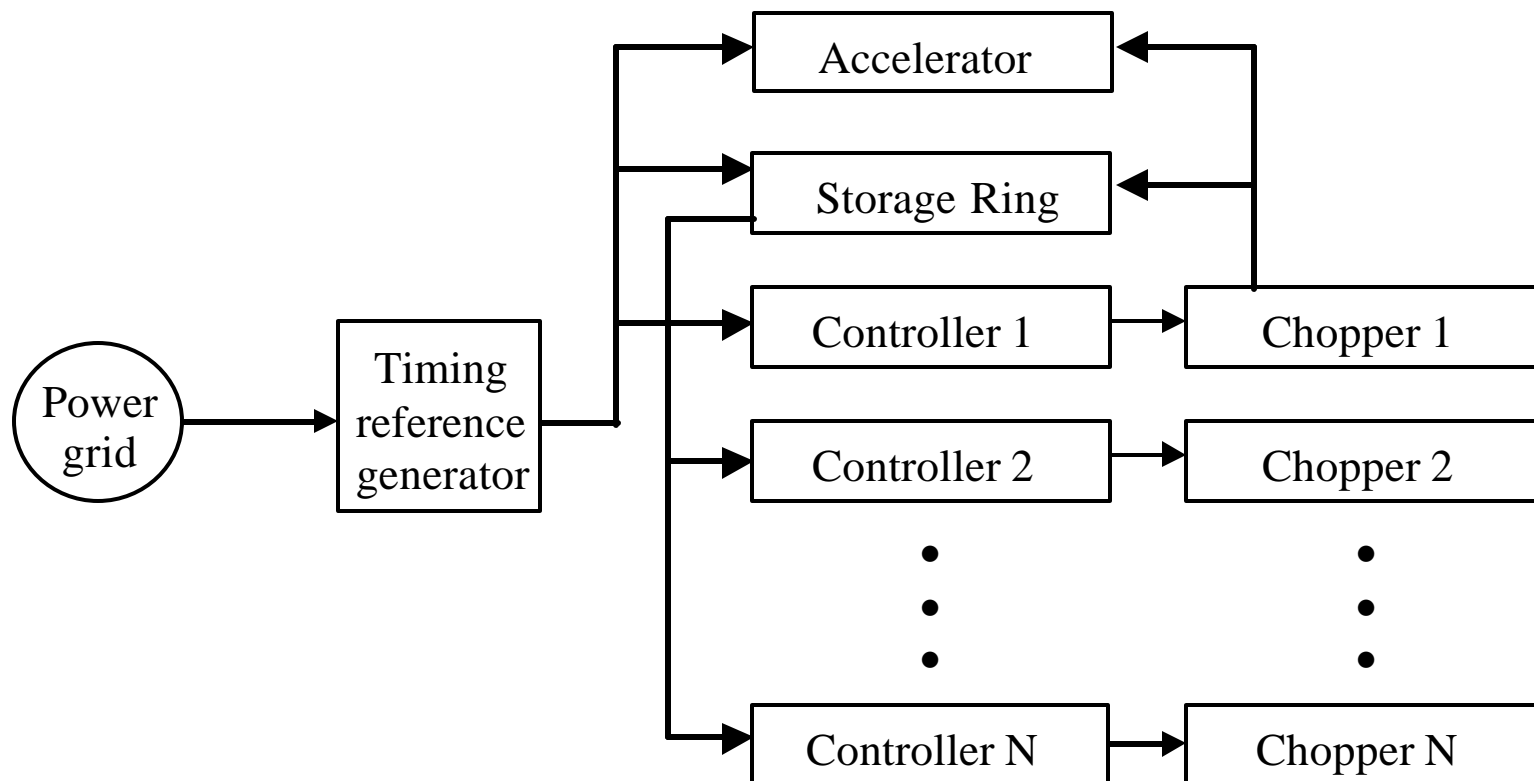
Propositions

- Timing for pulsed sources should be planned backwards starting with extraction at a fixed phase and working toward the leading edge of the beam pulse.
- Accelerator triggers and storage ring extraction offer only marginal benefits to accelerator-based spallation sources.
- The storage ring RF should be phase shifted to provide extraction without the one orbit timing uncertainty.

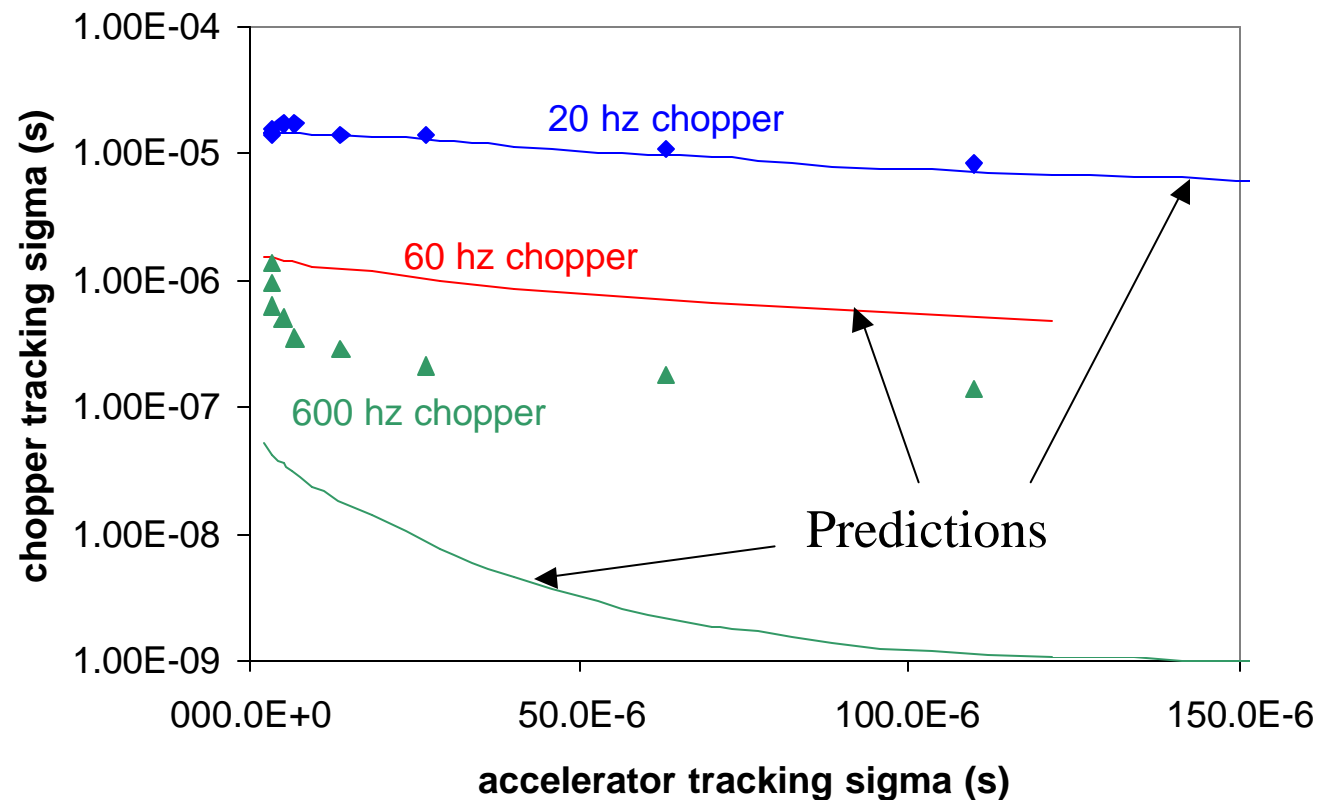
Extraction Timing Dependence on Beam Gates



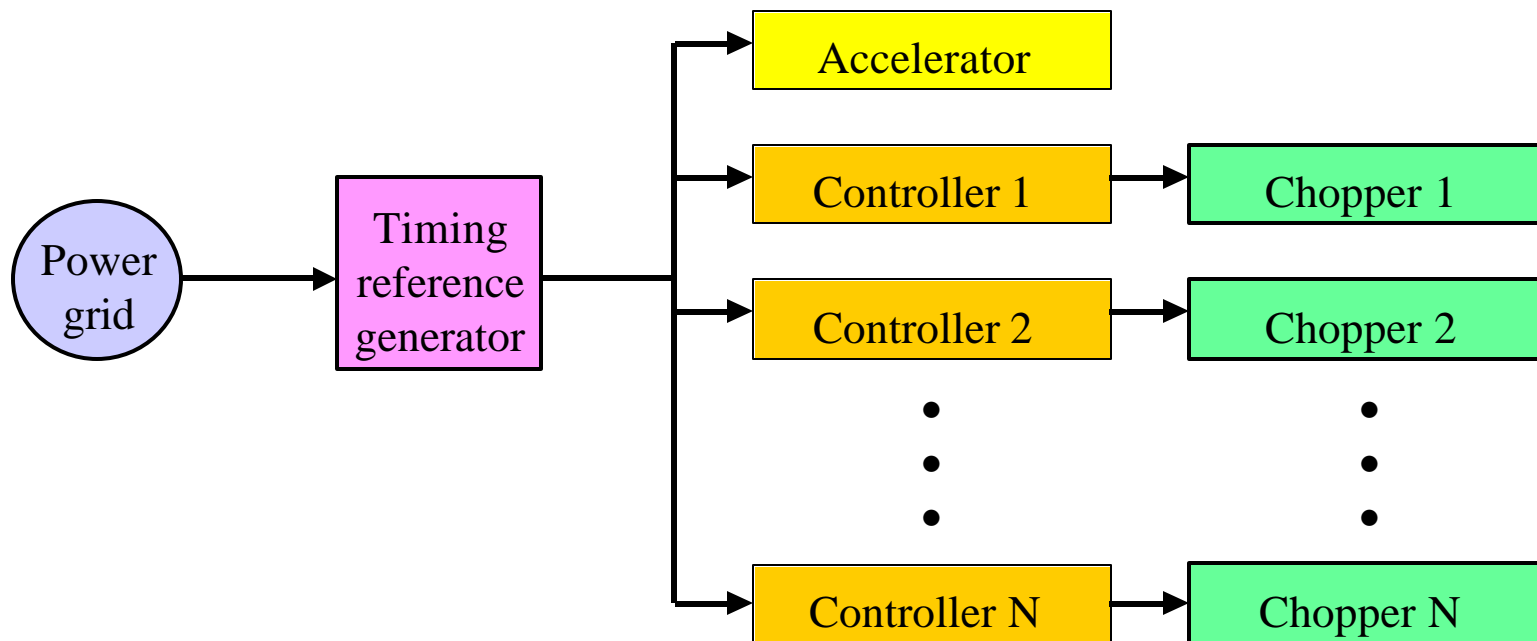
Timing Dependencies with Master Chopper



Latest Predictions and Results for Chopper Performance



Simplified Timing System for a Spallation Neutron Source



Phase the Storage Ring to the Timing Reference Generator

- Ring timing
 - nominal frequency is 1.05 MHz (period $\sim 1 \mu\text{s}$)
 - tune may slowly alter orbit time by 1 ns
 - loading for 1000 turns gives $1 \mu\text{s}$ uncertainty
- To synchronize to timing reference
 - timing reference generator knows extraction time
 - calculate the number of RF cycles until extraction
 - while ring and accelerator have no beam, shift phase for any fraction of a cycle

Summary

- Timing for accelerator, ring and choppers is simplified
- Perturbations for choppers are minimized
- Jitter presented to choppers is reduced